

SEQUENCE LISTING

<110> Sturmer, Rainer
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Hauer, Bernhard
Friedrich, Thomas
Breuer, Michael

<120> Methods for the production of
3-methylamino-1-(thiene-2-yl)-propane-1-ol

<130> 13111-00035-US

<150> PCT/EP2004/010939

<151> 2004-09-30

<150> DE 103 45 772.0

<151> 2003-10-01

<160> 44

<170> PatentIn version 3.3

<210> 1

<211> 47

<212> PRT

<213> Lactobacillus brevis

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Leu	Gly	Ile	Gly	Leu	Ala	Ile	Ala	Thr	Lys	Phe	Val	Glu	Glu	Gly	Ala
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<212> PRT

<213> Candida magnoliae

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Phe Ile

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Met Ser Asn Arg Leu Asp Gly Lys Val Ala Ile Val Thr Gly Gly Thr	
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ttg ggt atc ggt tta gct atc gcc acg aag ttc gtt gaa gaa ggg gct	96
Leu Gly Ile Gly Leu Ala Ile Ala Thr Lys Phe Val Glu Glu Gly Ala	
20 25 30	
aag gtc atg att acc ggc cgg cac agc gat gtt ggt gaa aaa gca gct	144
Lys Val Met Ile Thr Gly Arg His Ser Asp Val Gly Glu Lys Ala Ala	
35 40 45	
aag agt gtc ggc act cct gat cag att caa ttt ttc caa cat gat tct	192
Lys Ser Val Gly Thr Pro Asp Gln Ile Gln Phe Phe Gln His Asp Ser	
50 55 60	
tcc gat gaa gac ggc tgg acg aaa tta ttc gat gca acg gaa aaa gcc	240
Ser Asp Glu Asp Gly Trp Thr Lys Leu Phe Asp Ala Thr Glu Lys Ala	
65 70 75 80	
ttt ggc cca gtt tct aca tta gtt aat aac gct ggg atc gcg gtt aac	288
Phe Gly Pro Val Ser Thr Leu Val Asn Asn Ala Gly Ile Ala Val Asn	
85 90 95	
aag agt gtc gaa gaa acc acg act gct gaa tgg cgt aaa cta tta gcc	336
Lys Ser Val Glu Glu Thr Thr Thr Ala Glu Trp Arg Lys Leu Leu Ala	
100 105 110	
gtc aac ctt gat ggt gtc ttc ttc ggt acc cga tta ggg att caa cgg	384
Val Asn Leu Asp Gly Val Phe Phe Gly Thr Arg Leu Gly Ile Gln Arg	
115 120 125	
atg aag aac aaa ggc tta ggg gct tcc atc atc aac atg tct tcg atc	432
Met Lys Asn Lys Gly Leu Gly Ala Ser Ile Ile Asn Met Ser Ser Ile	
130 135 140	
gaa ggc ttt gtg ggt gat cct agc tta ggg gct tac aac gca tct aaa	480

Glu Gly Phe Val Gly Asp Pro Ser Leu Gly Ala Tyr Asn Ala Ser Lys
 145 150 155 160
 ggg gcc gta cgg att atg tcc aag tca gct gcc tta gat tgt gcc cta 528
 Gly Ala Val Arg Ile Met Ser Lys Ser Ala Ala Leu Asp Cys Ala Leu
 165 170 175
 aag gac tac gat gtt cgg gta aac act gtt cac cct ggc tac atc aag 576
 Lys Asp Tyr Asp Val Arg Val Asn Thr Val His Pro Gly Tyr Ile Lys
 180 185 190
 aca cca ttg gtt gat gac cta cca ggg gcc gaa gaa gcg atg tca caa 624
 Thr Pro Leu Val Asp Asp Leu Pro Gly Ala Glu Glu Ala Met Ser Gln
 195 200 205
 cgg acc aag acg cca atg ggc cat atc ggt gaa cct aac gat att gcc 672
 Arg Thr Lys Thr Pro Met Gly His Ile Gly Glu Pro Asn Asp Ile Ala
 210 215 220
 tac atc tgt gtt tac ttg gct tct aac gaa tct aaa ttt gca acg ggt 720
 Tyr Ile Cys Val Tyr Leu Ala Ser Asn Glu Ser Lys Phe Ala Thr Gly
 225 230 235 240
 tct gaa ttt gta gtt gac ggt ggc tac act gct caa 756
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 245 250

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<211> 252

<212> PRT

<213> Lactobacillus brevis

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Met Ser Asn Arg Leu Asp Gly Lys Val Ala Ile Val Thr Gly Gly Thr
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 Leu Gly Ile Gly Leu Ala Ile Ala Thr Lys Phe Val Glu Glu Gly Ala
 20 25 30
 Lys Val Met Ile Thr Gly Arg His Ser Asp Val Gly Glu Lys Ala Ala
 35 40 45
 Lys Ser Val Gly Thr Pro Asp Gln Ile Gln Phe Phe Gln His Asp Ser
 50 55 60
 Ser Asp Glu Asp Gly Trp Thr Lys Leu Phe Asp Ala Thr Glu Lys Ala
 65 70 75 80
 Phe Gly Pro Val Ser Thr Leu Val Asn Asn Ala Gly Ile Ala Val Asn

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<213> Candida magnoliae

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 Ile Lys Leu Ala Glu Glu Gly Tyr Ser Val Thr Ile Ala Ser Arg Gly
 20 25 30
 ctt aag cag ctc gag gct gtg aag gcc aaa cta ccc att gtg aag cag 144
 Leu Lys Gln Leu Glu Ala Val Lys Ala Lys Leu Pro Ile Val Lys Gln
 35 40 45
 gga cag gtt cac cac gtg tgg cag ctt gat ctc agt gat gtc gac gct 192
 Gly Gln Val His His Val Trp Gln Leu Asp Leu Ser Asp Val Asp Ala
 50 55 60
 gcg gcc gcc ttc aaa ggg tcg ccg cta cct gcc agc cgc tac gac gtg 240
 Ala Ala Ala Phe Lys Gly Ser Pro Leu Pro Ala Ser Arg Tyr Asp Val
 65 70 75 80
 ctc gtc agc aat gct ggc gtg gcc cag ttt agc ccg ttc atc gag cat 288
 Leu Val Ser Asn Ala Gly Val Ala Gln Phe Ser Pro Phe Ile Glu His
 85 90 95
 gcg aag cag gac tgg tcg cag atg ctt gcc atc aat ctg gcg gca ccc 336
 Ala Lys Gln Asp Trp Ser Gln Met Leu Ala Ile Asn Leu Ala Ala Pro
 100 105 110
 att gcg ctg gcc cag aca ttt gct aag gcc att ggc gac aag ccg cgc 384
 Ile Ala Leu Ala Gln Thr Phe Ala Lys Ala Ile Gly Asp Lys Pro Arg
 115 120 125
 aac aca ccg gcc cac att gtg ttt gtc tcg tcg aac gtc tcg ttg cga 432
 Asn Thr Pro Ala His Ile Val Phe Val Ser Ser Asn Val Ser Leu Arg
 130 135 140
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 Gly Phe Pro Asn Ile Gly Val Asn Ser Ile Thr Pro Gly
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<211> 157

<212> PRT

<213> *Candida magnoliae*

<400> 6

Asn Ala Leu Val Thr Gly Gly Ser Arg Gly Ile Gly Glu Ala Thr Ala
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 Ile Lys Leu Ala Glu Glu Gly Tyr Ser Val Thr Ile Ala Ser Arg Gly
 20 25 30

Leu Lys Gln Leu Glu Ala Val Lys Ala Lys Leu Pro Ile Val Lys Gln
 35 40 45

Gly Gln Val His His Val Trp Gln Leu Asp Leu Ser Asp Val Asp Ala
 50 55 60

Ala Ala Ala Phe Lys Gly Ser Pro Leu Pro Ala Ser Arg Tyr Asp Val
 65 70 75 80

Leu Val Ser Asn Ala Gly Val Ala Gln Phe Ser Pro Phe Ile Glu His
 85 90 95

Ala Lys Gln Asp Trp Ser Gln Met Leu Ala Ile Asn Leu Ala Ala Pro
 100 105 110

Ile Ala Leu Ala Gln Thr Phe Ala Lys Ala Ile Gly Asp Lys Pro Arg
 115 120 125

Asn Thr Pro Ala His Ile Val Phe Val Ser Ser Asn Val Ser Leu Arg
 130 135 140

Gly Phe Pro Asn Ile Gly Val Asn Ser Ile Thr Pro Gly
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 gggaattcca tatgtctaac cgtttgg

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acgacgacgt cgaacgcbct bgtbacgg

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gccgggggttg atsswggttsa cgccgat

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Ser Thr Thr Ser Asn Ala Leu Val Thr Gly Gly Ser Arg Gly Ile Gly
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Ala Ala

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Ile Gly Val Asn Ser Ile Asn Pro Gly
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Ser Asn Arg Leu Asp Gly Lys Val Ala Ile Val Thr Gly Gly Thr Leu
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Gly Ile Gly Leu Ala Ile Ala Thr Lys Phe Val Glu Glu Gly Ala Lys
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Val Met Ile Thr Gly Arg His Ser Asp Val Gly Glu Lys Ala Ala Lys
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Ser Val Gly Thr Pro Asp Gln Ile Gln Phe Phe Xaa
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Thr Pro Leu Val Asp Asp Leu Pro Gly Ala Glu Glu Ala Met Ser Gln
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Arg Arg Xaa Xaa
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Ser Val Glu Glu Thr Thr Thr Ala Glu Trp Arg Xaa Xaa Xaa Xaa
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Ser Val Gly Thr Pro Asp Gln Xaa Gln Phe Phe Gln His Asp Ser Ser
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Asp Glu Asp Gly
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Val Asn Thr Val
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Ala Phe Ile Pro Gly Lys Arg
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Ser Ala Ala Leu Asp Xaa Ala Leu Lys Xaa Xaa Xaa Xaa Xaa Xaa
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Xaa Xaa

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Xaa

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Lys Leu Leu Ala Val Asn Leu Asp Gly Val Phe Phe Gly Thr Arg Xaa
 1 5 10 15

Xaa Xaa Xaa Xaa
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<210> 26
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Xaa Met Xaa Thr Gly Arg
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Thr Lys Thr Pro Met Gly His Ile Xaa Glu Pro Asn Xaa Ile Ala
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<210> 28
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Thr Lys Thr Pro Met Gly Xaa Ile Ala Glu Pro Asn Asp Ile Ala Tyr
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Xaa Xaa Xaa Xaa
 20

<210> 29
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<220>
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 <223> Amino acid is Val (unsure) or Asn

<220>
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 <222> (25)..(25)

<400> 29

Lys Ala Ala Lys Ser Val Gly Thr Pro Asp Gln Ile Gln Phe Phe Gln
 1 5 10 15

His Asp Ser Ser Pro Glu Val Val Gln
 20 25

<210> 30
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 <223> Xaa is unreadable

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<220>
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 <222> (11)..(20)
 <223> Xaa is unreadable

<400> 30

Xaa Val Lys Leu Leu Ala Val Asn Leu Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10 15

Xaa Xaa Xaa Xaa
20

<210> 31
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<213> Lactobacillus brevis

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<220>
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 <223> Amino acid is Val or Asp

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<400> 31

Thr Val Phe Phe Gly Leu Lys Gln Asn Ile Glu Asn Ile Asn Ile Ala
 1 5 10 15

Ala Val Arg Pro
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<210> 32
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 <213> Lactobacillus brevis

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<223> Amino acid is Pro, Gln, or Tyr

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<400> 32

Gly Phe Val Gly Asp Pro Ser Leu Gly Ala Tyr Asn Ala Gly Lys Gly
 1 5 10 15

Ala Val Arg Ile Met Ser Lys Ser Ala Ala Leu Asp Xaa Xaa
 20 25 30

<210> 33
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<220>
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 <400> 33

Phe Val Val Asp Xaa Xaa Xaa Xaa Xaa Xaa
 1 5 10

<210> 34
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 <212> PRT
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<220>
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 <223> Amino acid is Asp or Glu

<220>
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<220>
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<220>
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<400> 34

Asp Gly Xaa Thr Lys Leu Phe Asp Ala Thr Glu Glu Xaa Xaa Xaa Xaa
 1 5 10 15

Xaa Xaa Xaa Xaa
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<210> 35
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 <212> PRT
 <213> Lactobacillus brevis

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<400> 35

Phe Val Val Asp Gly Gly Tyr Thr Ala Gln Xaa Xaa Xaa Xaa
 1 5 10

<210> 36
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 <213> Lactobacillus brevis

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 <223> Amino acid is Val (unsure) or Asp

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<400> 36

Xaa Ala Leu Lys Asp Tyr Asp Val Arg Val Asn Thr Val His Pro Gly
 1 5 10 15

Tyr Ile Lys Thr Pro Leu Val Val Asp Leu Pro Gly Ala Glu
 20 25 30

<210> 37
 <211> 15
 <212> PRT
 <213> Lactobacillus brevis

<400> 37

Lys Ala Ala Lys Ser Val Gly Thr Pro Asp Gln Ile Gln Phe Phe
 1 5 10 15

<210> 38
 <211> 13
 <212> PRT
 <213> Lactobacillus brevis

<400> 38

Gly Ala Lys Val Met Ile Thr Gly Arg His Ser Asp Val
 1 5 10

<210> 39
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<223> Amino acid is Ser or Tyr

<220>

<221> VARIANT

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<223> Amino acid is Glu or Leu

<400> 39

Ser Lys Phe Ala Thr Gly Ser Glu Phe Val

1

5

10

<210> 40

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<212> PRT

<213> Lactobacillus brevis

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 <223> Amino acid is Pro or Leu

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Xaa Asp Val Arg Val Asn Thr Val His Pro Gly Tyr Ile Lys Thr Pro
 1 5 10 15

Leu Val Asp Asp Leu Pro Gly Ala Glu
 20 25

<210> 41
 <211> 40
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<400> 41

Trp Xaa Lys Leu Leu Ala Val Asn Leu Asp Gly Val Phe Phe Gly Thr
 1 5 10 15

Arg Leu Gly Ile Gln Arg Met Lys Asn Lys Gly Leu Gly Ala Ser Ile
 20 25 30

Ile Asn Met Ser Ser Ile Xaa Xaa
 35 40

<210> 42
 <211> 40
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<220>
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<400> 42

Ala Met Ser Gln Arg Thr Lys Thr Pro Met Gly His Ile Gly Glu Pro
 1 5 10 15

Asn Asp Ile Ala Tyr Arg Met Lys Tyr Lys Ala Leu Gly Ala Ser Ile

20

25

30

Ile Asn Met Ser Xaa Xaa Xaa Gly
 35 40

<210> 43
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 <213> Lactobacillus brevis

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<400> 43

Ser Lys Phe Ala Thr Gly Ser Glu Phe Val Val Xaa Xaa Xaa Xaa
 1 5 10 15

<210> 44
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 <212> PRT
 <213> Lactobacillus brevis

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<220>
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<220>
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<400> 44

Ser Lys Phe Ala Thr Gly Ser Glu Phe Val Val Asp Xaa Xaa Xaa
 1 5 10 15